REMARKS

Applicant respectfully requests reconsideration. Claims 1-9 were previously pending in this application. Claims 1-4 and 6-9 have been amended herein. New claims 10-20 have been added. As a result, claims 1-20 are pending for examination with claims 1 and 10 being independent. No new matter has been added.

Rejections Under 35 U.S.C. §102

In the Office Action mailed March 17, 2008, claims 1-3 and 5-9 are rejected under 35 U.S.C. §102(b) as purportedly being anticipated by Hoffman et al. (U.S. Patent No. 4,894,302). Without acceding to the propriety of these rejections, Applicant has herein amended the claims for the sole purpose of furthering prosecution. In view of these amendments, Applicant respectfully requests reconsideration.

As amended, claim 1 recites, "[a]n electrochemical device comprising a first pole, a second pole, and an ionic conductor, the first pole comprising an active material ..., wherein the active material has an average particle diameter as small as 1 nanometer." In rejecting claim 1 based on Hoffman, the Office Action appears to interpret the first pole as the cathode 3 in Figure 1 of Hoffman (Office Action: page 2, line 15). However, nowhere does Hoffman provide a discussion regarding the particle sizes of the active material of the cathode. In particular, Hoffman does not teach or suggest that the active material of the cathode has an average particle diameter of 1 nanometer or larger. Therefore, claim 1 patentably distinguishes over Hoffman.

Accordingly, Applicant respectfully requests that the rejection of claim 1 under U.S.C. §102 be withdrawn.

Claims 2-3 and 5-9 depend from claim 1, and each of these claims patentably distinguishes over Hoffman for at least the same reasons. Accordingly, Applicant respectfully requests that the rejections of claims 2-3 and 5-9 under U.S.C. §102 be withdrawn.

Rejections Under 35 U.S.C. §103

Claim 4 is rejected in the Office Action under 35 U.S.C. §103(a) as purportedly being unpatentable over Hoffman et al. in view of Isenberg (U.S. Patent No. 4,054,729). The Office Action appears to assert that Hoffman teaches all limitations of claim 4, except "wherein the active material for the first pole has an average particle diameter no smaller than 1 nanometer and no larger than 100 micrometers," and the Office Action appears to rely on Isenberg for this limitation.

Applicant respectfully traverses this rejection. In particular, Applicant disagrees with the rejection because one of ordinary skill in the art would not have been motivated to combine Hoffman and Isenberg. Furthermore, claim 4 depends from claim 1, and claim 1 has been amended herein to recite, "[a]n electrochemical device ... wherein the active material has an average particle diameter as small as 1 nanometer." Even if the combination of Hoffman and Isenberg were proper, it does not teach or disclose the limitation, "the active material for the first pole has an average particle diameter as small as 1 nanometer."

I. There is no motivation to combine Hoffman and Isenberg.

Hoffman discloses an electrochemical cell which is capable of operation at embient temperature and which comprises an intercalation cathode capable of containing an intercalated ionic species (Hoffman: column 3, lines 42-45). "Generally, intercalation chemistry is concerned with the insertion of metal guest ions into inorganic host structures... Intercalation reactions are commonly viewed as correlating with a change in the electronic (oxidation) state of the host lattice" (Hoffman: column 2, lines 21-28).

By contrast, Isenberg provides a high temperature battery which operate at temperatures of between about 400°C and about 650°C (Isenberg: column 1, lines 50-58), and nowhere does Isenberg discuss inserting metal guest ions into host lattice structures in the cathode.

Furthermore, Hoffman teaches forming the electrodes by compressing powdered materials, including a suitable portion of a binder that is inert to the electrolyte, and heating if necessary to flux the binder (Hoffman: column 6, lines 3-14).

By contrast, in Isenberg, electrodes are made by pasting a slurry onto a plaque structure (Isenberg: column 3, lines 9-12). In particular, the cathode can be a sintered nickel power plaque

or a pressed or diffusion bonded fiber metal plaque, which can then be sintered to a low carbon steel sheet (Isenberg: column 3, lines 33-37). Metal sulfides are deposited within the plaque structure in an aqueous slurry form (Isenberg: column 3, lines 39-40). Isenberg does not teach or suggest compressing powdered materials including a binder inert to the electrolyte.

Furthermore, Hoffman teaches the use of a liquid electrolyte containing an organic solvent and an electrolytically active alkaline earth metal organometallic salt (Hoffman: column 3, lines 45-49). By contrast, Isenberg teaches a fused halide salt electrolyte, containing at least magnesium halide, preferably impregnated into a MgO, Al_2O_3, CaF, BN, or ZrO_2 corrosion and heat resistant fiber or powder matrix (Isenberg: column 1, lines 58-62). Isenberg does not teach or suggest a liquid electrolyte containing an organic solvent and organometallic salt.

Thus, the electrochemical cell of Hoffman and the high temperature battery of Isenberg differ fundamentally in at least the following three aspects: (i) environment of intended use, (ii) method of forming electrodes, and (iii) disposition and chemical composition of the electrolyte. Therefore, one of ordinary skill in the art would not have been motivated to combine the teachings of Hoffman and Isenberg. More specifically, the electrodes of Hoffman are formed in a different way compared to those in Isenberg, and Hoffman teaches the use of a liquid electrolyte as opposed to an electrolyte impregnated into a fiber or powder matrix. Therefore, it would not have been clear that adopting the range of particle sizes disclosed in Isenberg would provide any benefits in the setting of Hoffman.

II. Combination of Hoffman and Isenberg, even if proper, does not teach all limitations of claim 1.

As amended herein, claim 1 recites, *inter alia*, "the active material has an average particle diameter as small as 1 nanometer." Neither Hoffman nor Isenberg discloses this limitation.

In fact, Hoffman provides no discussions of the particle sizes of the cathode active material. Isenberg teaches a range between 100 nanometers and 50 micrometers (Isenberg: column 3, lines 41-43). The left endpoint of this range, namely 100 nanometers, is orders of magnitude larger than the lower limit of 1 nanometer, as recited in claim 1. Therefore, neither Hoffman nor Isenberg discloses "the active material has an average particle diameter as small as 1 nanometer," and claim 1 patentably distinguishes over Hoffman and Isenberg.

Claims 2-9 depend from claim 1 and are allowable for at least the same reasons. Accordingly, Applicant respectfully requests allowance of claims 1-9.

New Claims 10-20

Claims 10-19 are supported in the application as filed, e.g., at pages 4, 5, and 14. As discussed in the foregoing, neither Hoffman nor Isenberg teaches "the active material has an average particle diameter as small as 1 nanometer," therefore claim 10 patentably distinguishes over Hoffman and Isenberg. Claims 11-20 depend from claim 10 and are allowable for at least the same reasons. Accordingly, allowance of claims 10-20 are respectfully requested.

CONCLUSION

A Notice of Allowance is respectfully requested. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,

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